REMARKS/ARGUMENTS

Reconsideration of this patent application is respectfully requested in view of the foregoing amendments and the following remarks.

Claim 11 has been canceled without prejudice. Claims 12-20 have been amended and new claim 21 has been added.

The drawings were objected to under 37 C.F.R. § 1.83(a) as not showing every feature of the invention specified in the claims. A replacement drawing FIG. 3 showing transit channel 54 is submitted herewith as Attachment B.

The specification has been amended to add appropriate section headings, to delete references to claim numbers and to correct a statutory citation for a priority claim. A replacement abstract has enclosed as Attachment A. No new matter has been added.

Claims 11-20 have been rejected under as indefinite under 35 U.S.C. § 112, second paragraph. Claim 11 has been canceled

Schiebel et al. without prejudice and rewritten as new independent claim 21 to more clearly define the invention. Claims 12, 14, 15 16, 18 and 19 have been amended to depend from new claim 21. Applicant believes the claims as amended overcome the rejections under § 112.

Claims 11-18 were rejected under 35 U.S.C. § 102(b) as anticipated by *Schiebel et al.*, U.S. Patent No. 5,396,072. Claims 19-20 have been rejected under 35 U.S.C. § 103(a) as unpatentable over *Schiebel et al.* in view of *Bierig et al.* U.S. Patent No. 3,902,095.

The rejections are respectfully traversed.

For the reasons set forth below, Applicant believes that the semiconductor sensor as defined in independent claim 21 and dependent claims 12-18 of the present application is not anticipated by *Schiebel et al.* *Schiebel et al.* shows an X-ray image detector with a pixel structure in which a capacitance is designed to each pixel and the pixel structure is covered by a conductive layer. The conductive layer in *Schiebel et al.* (bias electrode 4) is used as a biasing electrode in order to direct

charge carriers to collecting electrodes. The charge carriers are generated in the photo conductor layer (3) of the *Schiebel et al.* device. (see *Schiebel et al.* at col. 1, ll. 32-44. In the invention as defined by claim 21 of the present invention, however, the biasing electrode of *Schiebel et al.* is not required.

The conductive layer disclosed in *Schiebel et al.* differs considerably from the structure as defined in claim 21 of the present application. The conductive layer (4) of *Schiebel et al.* covers as a single unity all of the underlying pixels, such that, for example, a voltage of up to 5 kV can be applied to the bias electrode. (see *Schiebel et al.* at col. 5 l. 64).

In contrast to the device disclosed in *Schiebel et al.*, in the semiconductor sensor as defined in claim 21, a discrete and separate conductive layer (11) is defined for each pixel and adjoining or neighboring conductive layers are separated and insulated by gaps. Thus, each pixel conductive layer is in contact with a semiconductor pixel associated with the particular pixel conductive layer.

In the semiconductor sensor as claimed in the present application, the pixel surface coating and second conductive layer covering a surface of the gaps separating adjoining pixel surface coatings prevent electrons from penetrating the semiconductor layer which could create defects such as dark currents, pixel errors or column failures. The X-ray image detector of *Schiebel et al.* would not achieve this result. *Schiebel et al.* does not disclose or suggest a semiconductor sensor which for electrons.

Bierig et al. relates to electron beam semiconductor amplifier diodes and electron beam semiconductor tubes employing such diodes. The electron beam semiconductor tubes are used as transmitter amplifiers, switching tubes or driver wave tubes in radar transmitters. (see *Bierig et al.* at col. 1, ll. 1-10; col. 6, ll. 1-5). According to *Bierig et al.* a conducting shield, which is preferably metal, is placed over the diode and has an aperture over a portion of the diode junction. (see *Bierig et al.* at col. 2, ll 13-14). Electrons deliberately enter the semiconductor and a shield layer (120) provides a shield against electron bombardment for the periphery of the device. (see *Bierig et al.* at col. 3, l. 67 -col. 4, l. 6). This eliminates

surface and bulk charging effects and increases maximum reverse bias voltage and maximum possible power output in the device according to *Bierig et al.* (see *Bierig et al.* abstract).

However, the semiconductor tube of *Bierig et al.* is not designed for and cannot be used for detecting electrons in an image oriented way. Thus the *Bierig et al.* reference., either alone or in combination with *Schiebel et al.* fails to disclose or suggest the semiconductor sensor for direct detection of electrons as defined in claim 21 of the present application.

For the reasons stated above, the Applicant believes the pending claims as amended claims are patentable over the references of record, either alone or in combination. Accordingly, the Applicant respectfully requests early allowance of the remaining claims.

Respectfully submitted,

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enclosures: Attachment A (replacement Abstract)
Attachment B (replacement FIG. 3)

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on July 14, 2004.

Maria Guastella

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